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The present reviewer subscribes heartily to these words and intends no belittling of this brilliant book, but the fact remains that so much space in it has been required for the applications of physical-chemical theory, that much of what we have hitherto considered higher inorganic chemistry has been crowded out, theory as well as fact, and that Erdmann's book supplies those facts and those theories which are lacking in Ostwald's. Every chemist should own and study both books.

EDWARD RENOUF.

NOTES.

Copies of the 'Descriptive Catalogue of Government Publications of the United States from September 5, 1774, to March 4, 1881, compiled, by order of Congress, by B. Perley Poore, Clerk of Printing Records, are now for sale for \$1.90. Remittance should be by money order payable to W. H. Collins, Chief Clerk, Government Printing Office, Washington, D. C.'

THE work on the 'Mammals of Egypt,' left unfinished by the recent death of Dr. John Anderson, will be completed under the supervision of Mrs. Anderson.

UNDER the title 'First on the Antarctic Continent' Mr. Borchgrevink, the commander of the recent Antarctic expedition, has now completed the account of his voyage in the *Southern Cross* and of the adventures and incidents in the land near the South Pole. The volume will be published very shortly by George Newnes (Limited).

PROFESSOR WILBUR C. KNIGHT has published a large-sized block-line geological map of Wyoming in Bulletin 45 of the Wyoming Experiment Station, accompanying 'A Preliminary Report on the Artesian Basins of Wyoming.'

D. K. KEILHACK has issued, through the Gebrüder Borntraeger of Berlin, the fourth yearly edition of his Taschenbuch für Geologen, Palæontologen und Mineralogen.

SOCIETIES AND ACADEMIES.

GEOLOGICAL SOCIETY OF WASHINGTON.

AT the 109th meeting, held at the Cosmos Club, January 23, 1901, the following papers were presented :

Shell Bluff, Georgia, one of Lyell's Original Localities: T. WAYLAND VAUGHAN.

This locality is in Burke county, Georgia, on the Savannah River, about 20 miles in a straight line below Augusta, and about 100 miles above Savannah. It was examined by Sir Charles Lyell during his first visit to the United States and was first brought into prominence by him. Subsequently Conrad visited and studied the bluff, and considering it paleontologically peculiar, gave the name Shell Bluff Group to the beds there exposed, correlating them with the base of the bluff at Vicksburg, Miss., and placing them in the columnar section immediately beneath the Jackson. Later several other geologists, including Loughridge and Professor W. B. Clark, visited the locality. Because of the prolonged discussion as to the precise position of the Shell Bluff section in the Eocene series, Mr. Vaughan visited the locality during December, 1900, and made a considerable collection of fossils. All the face of the bluff, something over 70 feet, except the uppermost 10 feet, contains a fauna identical in essential species with the Lisbon beds of Alabama, the Wautubbee beds of Mississippi, and the Texan and Louisianian Lower Claiborne of Harris and Vaughan. The uppermost layers contain almost exclusively *Ostrea Georgiana* Conrad, no fossils that could be used as positive stratigraphic indices being found, but it is most probable that this portion of the section also belongs to the same horizon. Compared with the section at Claiborne, Alabama, the section of Shell Bluff can be correlated with the Lisbon, the second horizon beneath the Claiborne sands proper, *i. e.*, it is below the *Ostrea settoniformis* bed which immediately underlies the Claiborne sands.

A few of the species are : *Turbinalia pharetra* Lea, *Endopachys maclurii* (Lea), *Mesalia obruta* (Conrad), *Venericardia planicosta* Lam., *Venericardia alticostata* (Conrad), *Corbula oniscus* Conrad, *Pteropsis lapidosa* (Conrad). Approximately forty species were collected.

Trias in Northeastern Oregon: WALDEMAR LINDGREN.

As a preliminary, the occurrences of marine Trias in the western part of North America

were reviewed. It was shown that a gap existed between the known localities in northern Nevada and California on one hand, and those of British Columbia on the other. This gap has partly been bridged by the discovery of an extensive series of marine Trias in northeastern Oregon. No Trias has previously been found in this State.

The result of a reconnaissance during the past field season has shown that the larger part of the Blue Mountains of Oregon are made up of older rocks of probably Carboniferous age. In the Eagle Creek Mountains, however, which form a circular mountain group in the extreme northeastern corner of Oregon, surrounded on nearly all sides by Columbia River lava, the marine Trias was found very strongly developed, although the fossils thus far obtained do not afford paleontological subdivisions. The fossils, though scant, unquestionably indicate a Triassic age. They consist, besides pentaacrinus stems and fragments of echinoids and ammonites, of various specifically indeterminable Halobias and Danonellas. The series consists of a great thickness, probably several thousand feet of shales and limestones. Associated and interbedded with these are vast masses of tuffs and various old lavas. The limestone is very prominently developed and its weathering gives rise to peaks and cliffs of Alpine character.

The same series was found well represented in the Snake River canyon on the boundary of Idaho and Oregon. Here, however, the volcanic material predominates, the sedimentary rocks appearing as intercalated masses. Halobias were again found in this series. It appears that these Triassic rocks continue with a north-easterly strike into Idaho across the Seven Devils and the lower Salmon River Canyon, until at some point in the vicinity of the Clear Water River, they give place to intrusive granites and older schists.

A Comparison of the Ouachita and Arbuckle Mountain Sections, Indian Territory: J. A. TAFF.

The Ouchita mountain range extends from the vicinity of Little Rock, Arkansas, to the Missouri, Kansas and Texas Railway, near Atoka, in Indian Territory. The hard sandstone and novaculite formations make ridges

rising from 1,000 feet at the end of the range, to nearly 2,000 feet in the central part. The high ridges have strikingly level crests which probably represent a Cretaceous plain. The softer rocks are generally worn down to heights between 600 and 1,000 feet above the sea.

The Arbuckle range, with the exception of a central igneous peak, contrasts strongly with the Ouachita range in physiographic aspects. It is strictly a plateau, only partially dissected and but little below the original Cretaceous base level. It rises gradually to about 1,350 feet on the west, from the Cretaceous contact having an average elevation of 750 feet, on the east and southeast. The gap between the Ouachita and Arbuckle uplifts is about 20 miles wide and is occupied by slightly disturbed coal measures and Cretaceous rocks.

The lowest rocks in the section of the Ouachita range are Lower Silurian sediments in the heart of the uplift near the Tertiary border southwest of Little Rock. Above these are the Lower Silurian novaculites, 1,200 feet thick, which were the highest Silurian strata recognized by L. S. Griswold, of the Arkansas Geological Survey. In Indian Territory above the novaculites are about 5,000 feet of shale. These are in turn succeeded by about 5,000 feet of sandstone. Above these sandstones comes limestone of Ordovician age. Lower Helderberg cherts and limestone, Mississippian shales and coal measures, complete the section above the Ordovician.

The section of the rocks in the Arbuckle mountain uplift from the Lower Helderberg upward is a repetition of the Ouachita mountain section upward from the same terrane, but is not nearly so thick. Below the lower Helderberg is a mass of Ordovician limestone with shale and sandstone of minor importance, reaching a total thickness of more than 6,500 feet. These cannot be compared lithologically with the known Ordovician in the Ouachita mountain uplift. The limestones rest unconformably upon a mass of older granites with a variable intervening bed of arkose and conglomerate.

The structure of the Ouachita range is typically Appalachian. The rocks for the most part have been sharply folded and very extensively overthrust. The structure of the eastern

half of the Arbuckle uplift consists of relatively wide shallow folds. The axial portions of the synclines have been dropped down by opposite normal faults. In some instances the vertical displacements amount to many thousand feet. The softer and thinner formations, from the upper Ordovician to the coal measures, which occupy the downthrown blocks, were crumpled into narrow folds prior to the faulting.

F. L. RANSOME,
DAVID WHITE,
Secretaries.

SECTION OF BIOLOGY OF THE NEW YORK
ACADEMY OF SCIENCES.

THE regular monthly meeting for January was held on the 14th, Professor C. L. Bristol presiding. Dr. H. E. Crampton was elected Secretary, in place of Professor F. E. Lloyd, resigned.

The following program was offered:

- (1) 'A New Species of *Phoronis*' : H. B. TORREY.
- (2) 'Characters and Relationships of the Belodont Reptiles' : J. H. MCGREGOR.
- (3) 'Notes on *Chrysoma pauciflosculosa*' ; 'On the Occurrence of Nectaries in *Pteris aquilina*' : F. E. LLOYD.

Mr. Torrey described a new species of *Phoronis*, the first that has been collected upon the western coast of America. It is intermediate in its characters between the European and eastern American species, and those found in Australia and the Philippines. In size it agrees with *P. Buskii*. The lophophore, though spirally coiled—thus differing from that of the European species—is less complex than that of *P. Buskii*, and the tentacles are fewer in number (200). The longitudinal muscles are stouter than those of *P. Buskii*, agreeing more nearly with the condition in *P. architecta* of the east coast. The new species agrees with this latter species in habit, in the possession of a longitudinal ciliated ridge in the digestive tract, and in the possible separation of the sexes.

Dr. McGregor presented the results of a recent study of the Belodonts, a group of fossil reptiles occurring in the Triassic of Germany and North America. The Belodonts have usually been regarded as ancestral crocodiles, though many students of the group have ad-

mitted possible affinities with Rhynchocephalia and Dinosauria. The material used in the present study, chiefly from the genera *Mystriosuchus* and *Rhytidodon*, yielded some parts new to science, e. g., the atlas and clavicle. The presence of two cervical intercentra and a large clavicle tends to ally the group more closely to the Rhynchocephalia. The hyoid apparatus was found to be suspended from the skull as in *Hatteria*; and there is strong evidence that the carpal (and probably also the tarsals) remained cartilaginous throughout life. Some doubt was expressed regarding the Belodont ancestry of the crocodiles, though it was admitted that the Belodonts stand near the crocodilian stem. The suggestion was made that the Belodonts may belong on or very close to the line of descent of the Ichthyosauria, occupying a position midway between some Permian land-living Rhynchocephalian and the marine Ichthyosauria of the Jurassic. In support of this theory, many structures of the Belodonts were shown to be such as one would expect to find in an ancestor of the Ichthyosauria, e. g., position of the nares, elongated premaxillary, bicipital ribs, form of the shoulder-girdle, etc. Some other structures, apparently incompatible with this view, were shown to be in reality not inconsistent with it.

In a discussion of Dr. McGregor's paper, Professor Osborn emphasized the importance of the Belodonts, and the conflicting nature of the opinions regarding them. Huxley placed them near the crocodiles, as evidenced by the choice of the name *Parasuchia* for the group. The paleontologists of the Stuttgart school relate them to Dinosauria. Dr. McGregor is the first to bring out the idea of their relationship to the Ichthyosauria; and, based as it is upon many new characters described for the first time, the theory is of great interest and importance.

Professor Lloyd stated that the chief point of interest in *Chrysoma pauciflosculosa*, a sub-tropical marine form, is in the structure of the leaves. The surface of these is sculptured in the form of a mosaic. This appearance is caused by deep and regularly-arranged involutions of the epidermis. At the bottom of each sulcus are to be found flagellated and glandular hairs, such as have been described by Vesque for

the Compositæ. Transverse sections show that each element of the mosaic contains chlorenchyma, which, though packed densely around the edges, forms in the middle a large air-chamber, suggesting in appearance the air-chambers of certain Hepaticæ. The leaf, a bi-facial one, is maintained in a vertical position.

In a second paper, Professor Lloyd drew attention to the occurrence, in *Pteris aquilina*, of nectaries near the bases of the pinnæ. The activity of these glands reaches a maximum during the development of the frond in spring and early summer, at which time large drops of syrupy nectar exude from the openings, which are modified stomata. The object of the speaker was to call the attention of teachers of general biology to the presence, in a much-used laboratory type, of organs which, though discovered by Francis Darwin in 1877, were generally overlooked.

In discussion of Professor Lloyd's first paper, Professor Britton remarked that the author's results were of value as throwing light upon the vexed question of the relationship of *Chrysoma* to the golden-rods (*Solidago*). The two groups were probably distinct. It was also recalled that the late Dr. Gregory had worked extensively upon this problem, but her full results had never been published.

HENRY E. CRAMPTON,
Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

At the meeting of the Academy of Science of St. Louis of January 21, 1901, twenty-seven persons present, the following subjects were presented:

Rev. M. S. Brennan read a short sketch of the progress of astronomy in the United States, in which the material equipment and the discoveries made in that science in this country during the past century were passed in review.

A paper by Professor T. G. Poats, entitled 'Isogonic Projection,' was presented in abstract.

Professor F. E. Nipher showed by means of the lantern a series of negatives printed by contact from a lantern slide or positive picture, by the light of a 300 candle incandescent lamp. The unit of exposure adopted was one lamp-meter-second. The exposures varied from

0.0054 to 4,800. All were developed in the dark room with hydrochinon, those above 0.1 exposure having in the bath one drop of saturated hypo to the ounce of bath. The plate having an exposure of 0.1 seemed to be normally exposed. An exposure 210 gave a negative showing some fogging, but a print from it by ordinary methods gave a very satisfactory result. With longer exposures, the plate began to reverse, locally. With an exposure of 3,600, which was an exposure of one hour at a distance of one meter from a 300-candle lamp, half of the plate still showed as a negative. The shadow on the gown of a figure in the landscape showed white as a negative, and the part of the gown in sunshine showed white as a positive. The penumbra between light and shadow was darker. All the details were sharp, but lights and shadows were somewhat incongruous. With an exposure of 4,800 the details had not yet all reversed, but the greater part of the plate had become a positive.

The greatest exposure giving a negative which would yield an acceptable print was 210, which was 39,000 times the least exposure which would give a good negative. All exposures of 210 and over gave complete positives when the plates were developed 1.41 meter from a 16-candle lamp, or in stronger light. As good a picture as has been obtained had an exposure of 4,800, and was developed within half a meter of a 300-candle lamp. A fair picture had even been obtained from a two-hour exposure to direct sunlight with a Cramer 'Crown' plate. This plate was developed in a perfectly dark room.

It was stated that hypo in the developing bath did not affect the zero condition, or change the character as regards positive and negative. When no hypo is used, the plate fogs so quickly that the picture is invisible, before it has time to fully develop. After fixing, the thin shadowy picture showing on the fogged plate has the same local positive and negative characters that are shown on the clearly defined picture of the same exposure, when developed in the hypo-hydrochinon bath.

The greatest exposures giving good results that have been measured with reasonable accuracy were about 900,000 times as great as the

least exposure giving a good negative in the dark-room. This factor can certainly be trebled. A plate having any intermediate exposure can be developed either as a good positive in the light, or as a good negative in the dark-room.

It was stated that the best results with plates near the zero condition had been reached with a rather strong bath, with two drops of saturated hypo to the ounce of bath.

Three persons were elected to active membership.

WILLIAM TRELEASE,
Recording Secretary.

SCIENCE CLUB OF THE UNIVERSITY OF
WISCONSIN.

THE January meeting of the Club was held on the evening of the 24th inst., President Birge in the chair. Professor J. M. Coulter, of the University of Chicago, delivered his address on 'The Teaching of Science' (substantially as published in this JOURNAL, Vol. XII., p. 281). At the close the president related an incident from his own early experience to show how completely scientific education was misunderstood by the classicists, and he expressed the opinion that the quality of science teaching in the universities is not so poor as Professor Coulter would have us believe. The president extended the very evident thanks of the audience to the speaker for his address.

E. R. MAURER,
Secretary.

DISCUSSION AND CORRESPONDENCE.

THE SIDGWICK MEMORIAL.

TO THE EDITOR OF SCIENCE: I have been asked to act in America for the English committee on a memorial to the late Professor Henry Sidgwick. Other Americans are probably acting also, but of this I do not know. A meeting in the interests of such a memorial was recently held at Cambridge, and an influential committee was appointed. The memorial will probably take the form of an endowed scholarship at Cambridge, though other projects are also before the committee. Seeing the services Sidgwick rendered to education—notably woman's education—and the very large use made of his books in American universities, it

is hoped that a considerable sum will be raised in this country. Contributions, to be forwarded through me, may be sent direct to Princeton, New Jersey.

J. MARK BALDWIN.

SHORTER ARTICLES.

RADIO-ACTIVE MINERALS.

IN searching for radio-active substances with one of Professor Rood's new electrometers, an instrument particularly well adapted to the purpose, several minerals not hitherto noted were found to be radio-active. Professor Rood suggested that I should try columbite, and gave me some specimens. The electrometer immediately shows that the air in the neighborhood of the mineral is ionized, and later photographic tests confirm the radio-activity of columbite. A chemical analysis of the specimens has not yet been made, but according to Dana, columbite does not contain uranium or thorium.

Specimens of erbium oxide and niobium oxide, from the museum of the chemical department, also show with the electrometer a slight ionizing effect. Further investigations are being made.

GEO. B. PEGRAM.

PHYSICAL LABORATORY OF COLUMBIA

UNIVERSITY, January 26, 1901.

THE MUSICAL BOW IN CALIFORNIA.

IN view of the present discussion in regard to the existence of the musical bow in America, and of its independent development on this continent, the occurrence (quite rare at present, however,) of a form of this instrument among the Maidu Indians of Northern California appears worthy of a brief note.

The bow as used by the Maidu is a simple bow of cedar, some $2\frac{1}{2}$ feet in length, at present strung with wire, but formerly with a fine sinew cord. In playing the instrument it is held in the left hand (the hand grasping the center of the bow, thumb inside and palm facing forward), the bow extending horizontally to the left. The right-hand end of the bow is placed in the open mouth, and the bow string tapped rapidly with a small flexible twig held in the right hand. By varying the size of the resonance chamber (the mouth) with the aid of the tongue, and by opening or closing the mouth to a greater or